Climatic data for Tampa, Fla., based on thirteen years Weather Bureau records unless otherwise stated.

[Latitude, 27° 57′ north; longitude, 82° 27′ west. Altitude, 34 feet.]

Months.	Temperature.														Humidity.	
	Mean temperature.			Extremes of monthly and annual means.		Mean of all maxima.	Mean of all minima.	Mean daily range.	Mean of monthly and annual extremes.		Mean monthly and annual range.	Absolute extremes, 13 years.		Mean daily variability.	Vapor pressure, 10 years.	Relative humidity. Per cent.
	All records.	Number of years.	13 years, 1890–1903.	Maximum.	Minimum.				Maximum.	Minimum.		Maximum.	Minimum.			
January	60.6	42	59.1	63.6	55.0	68.2	50.1	18.0	80	33	47	82	27	4.5	0.389	81
February	62.8	42	61.6	69.0	54.4	70.3	52.9	17.5	80	33	47	86	22	4.6	0.416	81
March	66.9	42	66.6	71.9	62.0	75.7	57.5	18.3	84	41	43	88	32	3.5	0.488	79
April	71.4	42	70.2	73.3	66.6	79.9	60.5	19.4	88	48	39	90	38	2.4	0.512	74
May	76.3	43	76.2	78.2	73.8	85.5	66.9	18.6	91	58	32	93	53	1.8	0.650	75
June	79.9	44	80.1	81.0	78.9	88.8	71.5	17.2	94	66	28	95	64	1.6	0.770	81
July	81.0	44	81.3	82.7	79.8	89.3	73.3	16.1	94	69	25	96	65	1.4	0.817	82
August	80.9	43	81.5	82.3	80.4	89.4	73.5	16.0	94	69	25	95	66	1.4	0.826	83
September	79.5	43	79.7	81.2	77.6	87.7	71.7	16.0	92	65	27	94	54	1.5	0.786	86
October	74.2	41	73.8	77.2	70.0	81.9	65.6	16.3	88	54	35	92	44	2.4	0.648	81
November	67.5	42	67.3	72.0	61.4	76.2	58.3	17.9	84	43	41	87	34	3.4	0.513	81
December	62.0	41	61.4	65.8	58.7	70.3	52.5	17.8	81	34	47	83	19	4.4	0.417	83
Year	71.9	.....	71.6	72.8	70.0	80.3	62.9	17.4	95	27	67	(*) 96	(†) 19	2.7	0.602	81

Months.	Rainfall.									Average thunderstorms.	Cloudiness.					Wind.			
	Average rainfall.			Monthly and annual extremes.		Greatest 24 hour rainfall.	Average number of rainy days.	Greatest successive number of days with—			Average 0–10.	Average days.			Average days with fog.	Prevailing direction.	Average velocity.	Maximum velocity.	
	All records.	Number of years.	13 yrs.	Maximum.	Minimum.			Rain.	Drought.			Clear 0–3.	P't cl'dy 4–7.	Cloudy 8–10.				Velocity.	Direction.
January	2.61	33	2.78	6.45	.28	2.75	8	5	23	1	4.9	10	15	6	2	ne.	6.2	36	sw., s.
February	3.13	32	3.48	6.27	.98	4.06	8	5	14	2	4.9	9	12	7	1	ne.	7.2	49	s.
March	3.00	33	2.91	7.36	.08	2.15	7	8	22	2	4.5	12	13	6	1	ne.	7.0	36	s., sw.
April	1.95	33	2.09	5.38	.16	2.70	6	5	24	2	4.3	13	12	5	0	w.	6.9	42	sw.
May	2.73	34	2.56	6.92	.33	3.36	7	12	16	4	4.5	11	15	5	0	w.	6.4	42	sw.
June	7.66	36	9.02	13.42	4.24	4.55	17	14	7	10	5.5	7	17	6	0	se.	5.7	37	sw.
July	9.56	37	8.14	15.53	2.11	5.16	18	10	8	11	5.6	6	19	6	0	e.	5.3	43	se.
August	9.36	36	8.65	17.83	4.93	3.98	18	18	10	13	5.8	4	20	7	0	se.	5.0	34	se.
September	6.41	34	8.10	17.28	4.80	6.56	17	16	13	6	5.5	7	15	8	0	ne.	5.7	43	ne.
October	2.57	34	3.14	5.11	.36	2.90	8	7	20	1	4.8	12	13	6	0	ne.	6.5	41	se.
November	1.84	34	1.73	3.96	.24	2.90	5	3	24	0	4.5	12	13	5	1	n.	5.9	36	s.
December	2.30	33	1.80	3.40	.54	1.77	7	4	22	0	4.8	12	11	8	1	n.	6.1	40	s.
Year	53.12	.....	54.42	66.93	42.06	.....	127	18	24	52	5.0	115	175	75	5	ne.	6.2	.....	.....

* July 8, 1902.

† December 29, 1894.

there is said to have been enough for snowballing in 1886. Thunderstorms occurred on no less than eighty-five days during the year 1900, and there were twenty-four days with thunderstorms in the month of August, 1901. As many as four thunderstorms in one day have been observed at the station. The highest velocity the wind attained in recent years was 49 miles, from the south, on February 28, 1902. Tradition recounts gales in 1848 and in 1859 that caused tides in the river at Tampa at least 12 feet higher than it is known to have reached in recent years.

THE FULTON AUTOMATIC RIVER GAGE AT CHATTANOOGA, TENN.[1]

By Prof. WESTON M. FULTON, Local Forecast Official, Weather Bureau.

This apparatus consists of two parts, the recorder, fig. 2, which is at the Weather Bureau station, and the gage, fig. 1, which is located at the river. The latter part consists of a pulley, A, about 8 inches in diameter, and a small gear wheel, F, both mounted upon a shaft, B, which bears upon the supports C, screwed to the base D. Mounted on the same shaft B, and just to the right (as seen in the drawing) of pulley A, is a small pulley about 1 inch in diameter. The end E of the shaft B, is threaded and screws through the support C. The pulley A and the small pulley have threads around their peripheries cut to the same pitch as the threads on the end of the shaft B. A fine brass spring wire, G, is wound around the pulley A; it passes down through a small hole, H, in the base

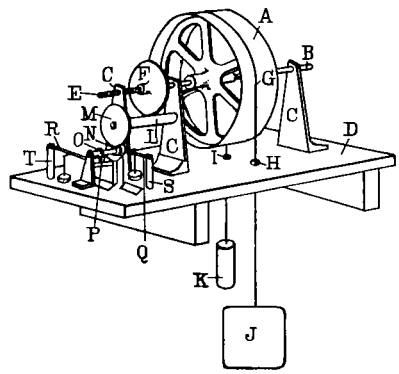

FIG. 1.—The Fulton automatic river gage—the gage.

of the apparatus, and supports the float J. The counterpoise K is in like manner suspended from the small pulley to the right of A, the wire which supports it being so wound upon the pulley that when the float J rises, the counterpoise K will unwind the wire from the small pulley and maintain the wire G taut. The object of the threads on the end E of the shaft B is to give the shaft and pulleys a lateral motion when they revolve, and thus hold the float J and the counterpoise K in the same vertical lines passing through holes in the base B. The gear wheel F, the long pinion L, the gear wheel M, and the pinion N constitute a gear train which so magnifies the motion of the pulley A that when the float, J, moves through a distance of one-tenth of a foot the small shaft O will make one complete revolution. From each end of the shaft O is loosely suspended a bar about 3 inches in length with a crescent-shaped cam attached to its face near the point of suspension. A T-bar, P, attached to shaft O, plays between these pendent

[1] This gage is the invention of Mr. Weston M. Fulton, Official in Charge of the United States Weather Bureau office at Knoxville, Tenn. One of them was installed at Chattanooga, Tenn., during February of the present year, and has been performing very satisfactorily since that time. In response to numerous requests from engineers and others interested, the above description of the gage has been furnished by Mr. Fulton.—ED.

bars, and has thin metal strips oppositely disposed on its two ends, which extend out slightly beyond the ends of the T-bar, so that when the shaft O is rotated in one direction one of these thin strips is pressed away from the T-bar by the pendent bar with which it comes into contact, and thus passes the pendent bar, while the other metal strip is pressed against the T-bar by the other pendent bar, and being thus braced, is enabled to raise the bar. As soon as the latter is raised slightly beyond the vertical position it falls of its own weight and assumes a vertical position again. In the act of falling,

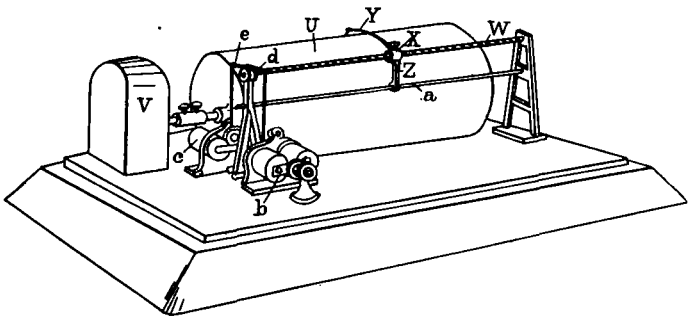

FIG. 2.—The Fulton automatic river gage—office recorder.

the cam on the face of the bar presses down the end of one of the projecting springs Q, R, and plunges the small platinum wire attached thereto into one of the cups of mercury located in the base of the apparatus immediately underneath the projecting springs Q and R. The springs Q, R are supported at their outer ends by the posts S, T. When the shaft O is rotated in the opposite direction, that pendent bar which has hitherto been idle is now brought into action, while the other is allowed to remain idle.

The float J moves in the iron casing which is attached to the face of the bridge pier, and has its lower end below the surface of the water in the river. The counterpoise K is suspended inside of a short iron pipe which is supported immediately underneath the base D, of the apparatus.

Fig. 2 shows the office recorder which is placed on the instrument stand in the observer's office. It consists of a drum, U, which is rotated by the clock V. The shaft W is threaded and carries a nut, X, which supports the pen Y. The bar Z slides along the guide rod a, and prevents the nut X from turning on the shaft W. The electro-magnets b, c operate the pawls d, e, which engage ratchets oppositely disposed on the shaft W. The pawls are so constructed that they act in a manner similar to a clock escapement and thus avoid the possibility of moving the ratchets more than one tooth at a time. The gage is operated over a metallic circuit consisting of three wires. One wire passes through both of the mercury cups, fig. 1, thence through the battery and then connects with one end of the wire in each set of magnets b, c. The other two wires connect with the posts S, T, respectively, and with the other ends of the magnet wires. When the water in the river changes a tenth of a foot, the float J changes its elevation in the casing by the same amount, and this motion causes the pulley A to act through the gear train F, L, M, N, O, and gives one of the pendent bars a complete revolution, thereby closing the electric circuit long enough to move one of the pawls d, e, fig. 2, and thus change the position of the pen on the record sheet which is wound around the drum U. The pawl d operates when the river is falling, while the pawl e operates when it is rising, thus causing the pen Y to move to the right, as seen in fig. 2, when the river rises, and to the left when it falls.

The half tone, fig. 3, shows the general appearance of the apparatus and its accessories.

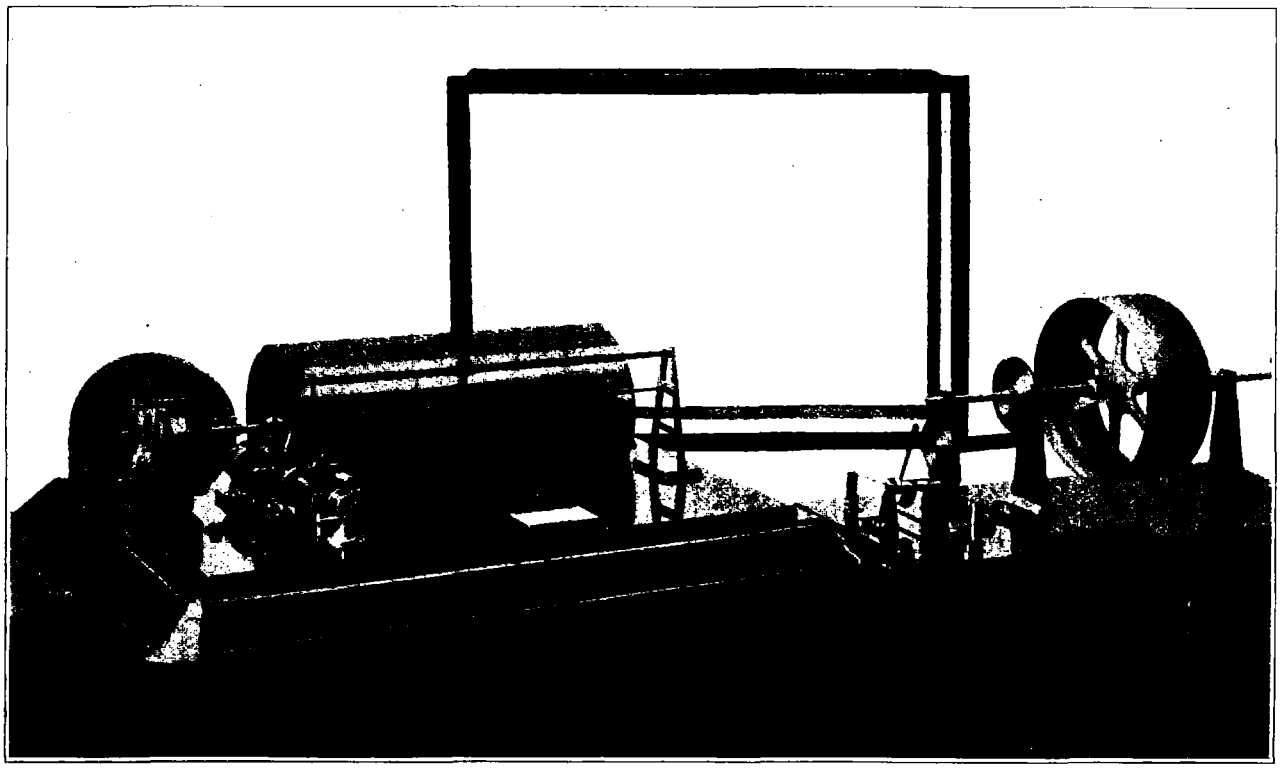

FIG. 3.—The Fulton automatic river gage—general view.